

LEGEND

◆ PERCOLATION TEST LOCATION

⊕ TEST PIT LOCATION

--- EXISTING GROUND CONTOUR

--- PROPOSED CONTOUR

--- EDGE OF WET AREA

SHEET REVISED by:

STATE OF VERMONT
DAVID W. FUQUA
280-B
LICENSED DESIGNER

Ridge Consulting Engineers

434 Shelburne Road - P.O. Box 4503
Burlington, Vermont 05406-4503 (802)863-7182
PROJECT MANAGER: D. Fuqua PROJECT NUMBER: 08617

- Water Supply & Wastewater
- Site Engineering & Design
- Stormwater Management
- Topographic Surveys
- Act 250 Permitting
- Wetland Evaluations

NO.	DATE	DESCRIPTION	BY
2	4/15/10	Revise plan and details to include two additional, existing bedrooms	DWF
1	3/18/10	Add updates to Lot 1 wastewater disposal system	DWF

Find the head loss the lateral assuming a central Manifold:

Orifice No.	Total Flow in segment (g.p.m.)	H /13'	Total H
1	2.52	0.00	0.00
2	5.04	0.02	0.02
3	7.56	0.05	0.07

Head loss along a 2" Manifold for 5' @ 12.6 g.p.m. = 0.02 ft.

Pressure Differential between any two orifices is:

$$\frac{231}{2.31 + (0.02 + 0.07)} = 0.96 \text{ or } 4\% \text{ difference}$$

Total head losses: (Worst case) For Lot 1

Distribution Piping: 2.40'

255' of 2" P.V.C. @ 25.2 G.P.M.: 2.80'

Elevation: 9.00'

Total: 14.20'

Use Hydromatic Pump SP 40, 4/10 H.P. Single Phase, 115 volt, 14.20 TDH @ 25.2 G.P.M.

Total head losses: (Worst case) For Lot 2

Distribution Piping: 2.40'

87' of 2" P.V.C. @ 25.2 G.P.M.: 0.96'

Elevation: 11.00'

Total: 14.36'

Use Hydromatic Pump SP 40, 4/10 H.P. Single Phase, 115 volt, 14.36 TDH @ 25.2 G.P.M.

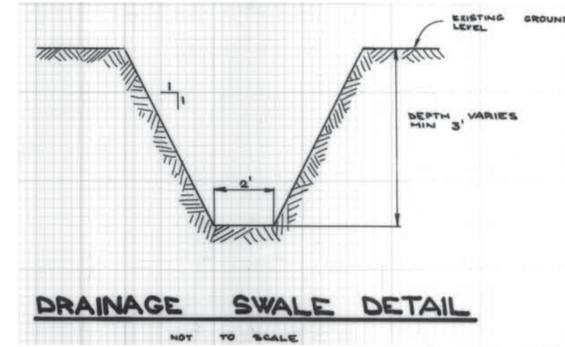
For a proposed replacement area use four foot wide trenches, need 188 L.F., use 3 trenches @ 63'

Boundary and topographic information provided by owner.

Maintain 75' isolation distance between water service and disposal areas and septic tank.

CONSTRUCTION PROCEDURE

- Contact the Design Engineer, prior to construction for an on-site meeting with the Contractor to discuss the construction and to stake out the mound with the proper orientation according to the approved plan.
- Closely cut and remove all above ground vegetation throughout the area to be covered by the fill material. Tree stumps should be cut flush with the ground surface, but the roots should not be removed. Prior to plowing, install the dosing discharge line from the point of connection with the distribution piping header to beyond the mound construction area.
- Plow the area to a depth of 7" to 8", parallel to the land contours with the plow throwing the soil uphill to provide a proper interface between the natural soils and fill material. Construction or plowing shall not be started when the soil moisture content is high. (If a sample of soil obtained approximately 9" below the surface can be easily rolled into a wire, the soil moisture content is too high for construction purposes.)
- Place the sand texture soil (sieve analysis; 85% passing the No. 10 sieve, 30% to 50% passing the No. 40 sieve, and 5% to 10% passing the No. 200 sieve) around the edge of the plowed area by dumping it on the plowed area, but keeping the wheels of the dump truck off the plowed area. Use a crawler tractor with a blade to move the sand around into place keeping at least 6" of sand under the tracks to minimize compaction of the plowed layer. Place all of the sand needed in the mound, which will be to the top of the bed. Shape the sides to the desired slope.
- With the blade of the tractor, form the bed by moving along its length. The sand walls will stay sufficiently stable. Make sure the bottom of the bed is level. Some hand shoveling will be necessary. Using a bucket on the crawler, dump the stone in the bed by traveling up the side slope. Level the stones off at the desired elevation (6" above the bed bottom).
- Install the distribution piping as shown on the plan and contact the Design Engineer who will direct testing of the distribution system. Insure that the pipe is bedded properly with all dips and rises removed and cover the pipe with a minimum of 2" of the stone.
- Place straw or marsh hay 3" to 4" thick (uncompacted) or untreated building paper over the top of the stone.
- Crown the entire mound with a cover of soil less permeable than the mound fill, covering with 12" on the side slopes and a minimum of 18" over the center of the mound. Native soil from the site is normally suitable for cover material, though the top 2" to 4" of this cover should be topsoil.
- Seed and mulch the entire mound to ensure stability of the installation. Shrubs placed at the foot and up the slope on the sides and ends are recommended. However, do not place shrubs directly on top of the mound as roots may interfere with the distribution system.
- Form the surface water diversion swale as shown on the plan. Direct all surface water away from the mound.



Soil Profiles

November 7, 1986

Test Pit No.	Soil Profile	Test Pit No.	Soil Profile
Test Pit No. 1	0" - 8" Topsoil	Test Pit No. 2	0" - 6" Topsoil
8" - 20" Brown fine sand, mottles @ 12"		6" - 30" Brown fine sand, distinct mottles @ 20", wet @ 18", water @ 24"	
20" - 45" Dense gray clay, water @ 20"		30" - 48" Dense gray clay	
Test Pit No. 3	0" - 6" Topsoil	Test Pit No. 4	0" - 6" Topsoil
6" - 22" Brown fine sand, mottles @ 15", wet @ 18"		6" - 14" Brown fine sand, dry	
		14" - 30" Dense gray clay	
Test Pit No. 5	0" - 6" Topsoil	Test Pit No. 6	0" - 6" Topsoil
6" - 27" Brown fine sand, mottled @ 24"		6" - 15" Gray brown compact fine sand, mottled, wet	
27" - 40" Dense gray clay		15" - 30" Dense gray clay, wet	
Test Pit No. 7	0" - 6" Topsoil	Test Pit No. 8	0" - 6" Topsoil
6" - 17" Brown compact fine sand, few mottles @ 15", dry		6" - 36" Brown fine sand, compact @ 20", mottled @ 21", wet	
17" - 30" Dense gray clay			
Test Pit No. 9	0" - 6" Topsoil	Test Pit No. 10	0" - 6" Topsoil
6" - 28" Brown fine sand, few mottles @ 14", saturated @ 21", bright mottles @ 21"		6" - 26" Brown fine sand, some mottles @ 18", saturated @ 20"	
28" - 40" Dense gray clay			
Test Pit No. 11	0" - 4" Topsoil	Test Pit No. 12	0" - 6" Topsoil
4" - 19" Brown fine sand, dry		6" - 25" Brown fine sand, dry	
19" - 32" Dense gray clay		25" - 38" Compact brown fine sand, mottled, dry	
		38" - 42" Dense gray clay	

Shallow Holes

December 16, 1986

Shallow Hole No.	Soil Profile	Shallow Hole No.	Soil Profile
Shallow Hole No. 1	0" - 3" Topsoil	Shallow Hole No. 2	0" - 3" Topsoil
3" - 14" Brown sand		3" - 20" Brown sand, moist, water @ 22"	
14" - 24" Moist, light brown sand			
Shallow Hole No. 3	0" - 5" Topsoil	Shallow Hole No. 4	0" - 3" Topsoil
5" - 24" Brown sand, moist @ 23"		3" - 7" Gray organic material	
		7" - 34" Brown sand	
Shallow Hole No. 5	0" - 3" Topsoil	Shallow Hole No. 6	0" - 3" Topsoil
3" - 26" Brown sand, mottled @ 20"		3" - 14" Gray silty sand	
Shallow Hole No. 7	0" - 3" Topsoil	Shallow Hole No. 8	0" - 3" Topsoil
3" - 22" Brown sand		3" - 22" Brown sand	
Shallow Hole No. 9	0" - 3" Topsoil	Shallow Hole No. 10	0" - 6" Topsoil
3" - 24" Brown sand, moist @ 22"		6" - 17" Brown sand, moist @ 16"	
Shallow Hole No. 11	0" - 4" Topsoil	Shallow Hole No. 12	0" - 4" Topsoil
4" - 25" Brown sand, moist @ 23"		4" - 23" Brown sand	

Percolation Test Results

December 16, 1986

P - 1	8 minutes per inch
P - 2	11 minutes per inch
P - 3	13 minutes per inch
P - 4	1 minute per inch
P - 5	14 minutes per inch
P - 6	9 minutes per inch

Mound Design

For a bed design use an application rate of 1.2 Gal./S.F./day.

For a three bedroom house @ 150 Gal./B.R./day. The design flow is 450 Gal./day.

The required disposal area is:

$$\frac{450 \text{ Gal./day}}{1.2 \text{ Gal./S.F./day}} = 375 \text{ S.F.}$$

Use a bed, 6 feet by 62.5 feet.

Based on a design percolation rate of 13 min./in., the basal application rate is:

$$\frac{3}{\sqrt{t}} = \frac{3}{\sqrt{13}} = 0.83 \text{ Gal./S.F./day (maximum allowable - 0.74)}$$

The required Basal Areas are:

$$\frac{450 \text{ Gal./day}}{0.74 \text{ Gal./S.F./day}} = 608.1 \text{ S.F. (1500 S.F. provided)}$$

Pressure distribution design:

At 1 orifice per 50 S.F. disposal area, need a minimum of 8 holes. Use 10 holes, 5 holes/line, 12' o.c.

For a 3/8" hole and a minimum pressure of 1 psi in the distribution network. The flow through any one orifice is:

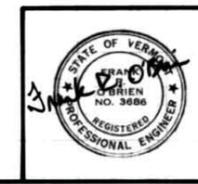
$$Q = CA\sqrt{2gh}$$

$$= 0.6 \left[\sqrt{\frac{3}{8} \times 1/12 \times 1/2^2} \right] \sqrt{2(32.2)(2.31)}$$

$$= 2.52 \text{ g.p.m.}$$

For 20 holes, the total flow, Q = 25.2 g.p.m.

Use 1 1/2" Sch. 40 P.V.C. distribution piping with solvent weld joints.



TWO LOT SUBDIVISION

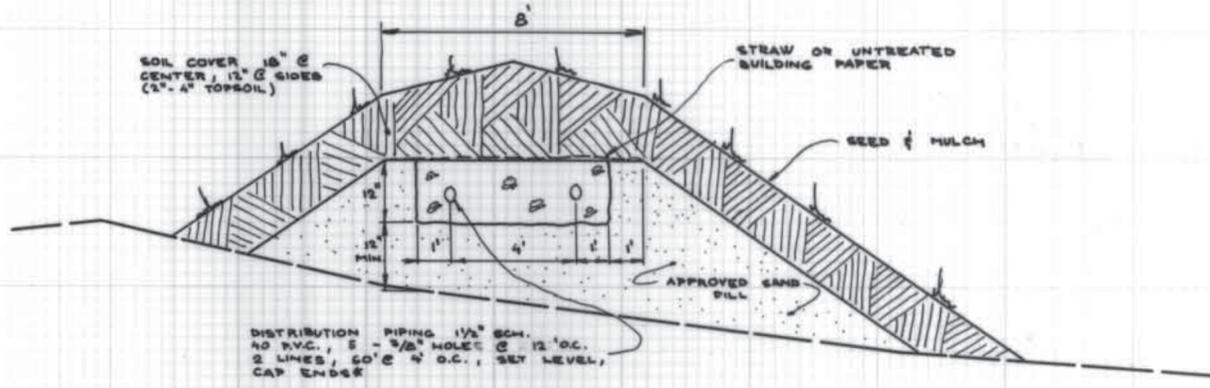
TOM BOVE

LAKE ROAD
CHARLOTTE, VERMONT

DATE: 03-17-87
PROJECT NO.: 6127
PREPARED BY: FRANK R. O'BRIEN P.E.
ROUTE 7, SHELBURNE, VERMONT
SHEET 1 OF 2

SITE PLAN

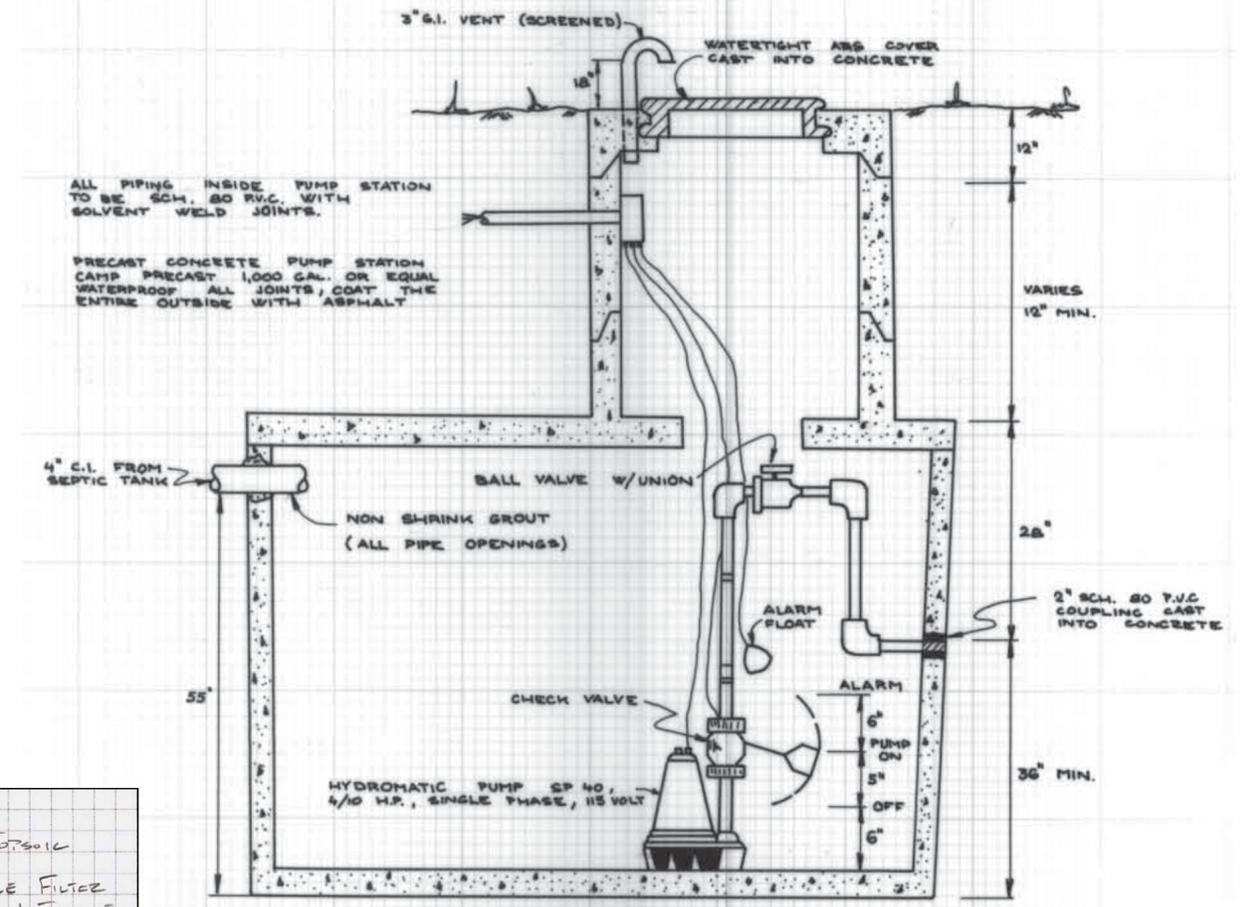
1" = 60'



SECTION B-B

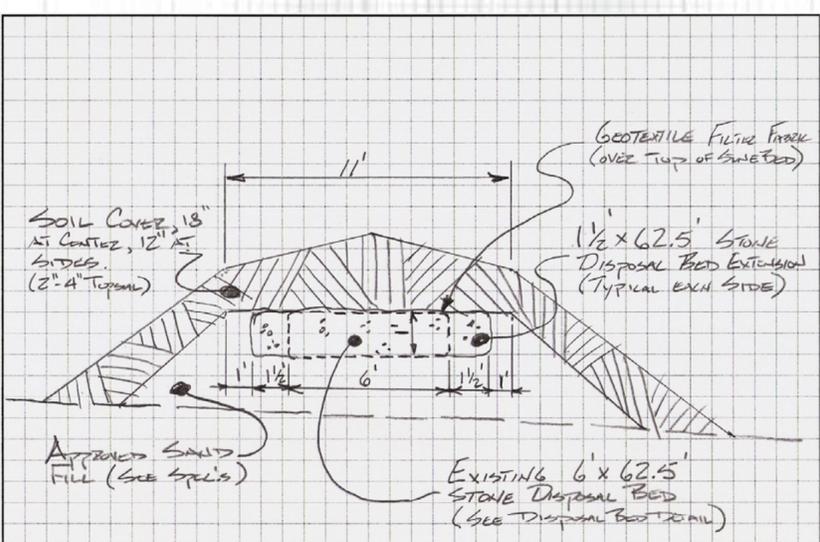
1" = 4' HORIZ.
1" = 2' VERT.

107
106
105
104
103
102
101

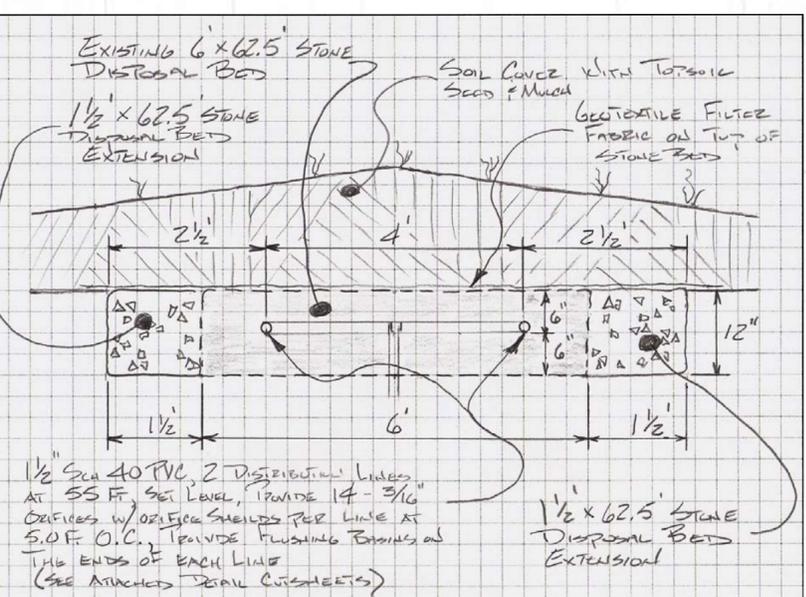


- NOTES:
1. A HIGH WATER AUDIO AND VISUAL ALARM TO BE INSTALLED IN HOUSE
 2. PLACE THE EFFLUENT PUMP ON A 4" X 6" CONCRETE BLOCK TO ALLOW SETTLEMENT OF SOLIDS
 3. PROVIDE 450 GALLONS OF STORAGE ABOVE ALARM FLOAT

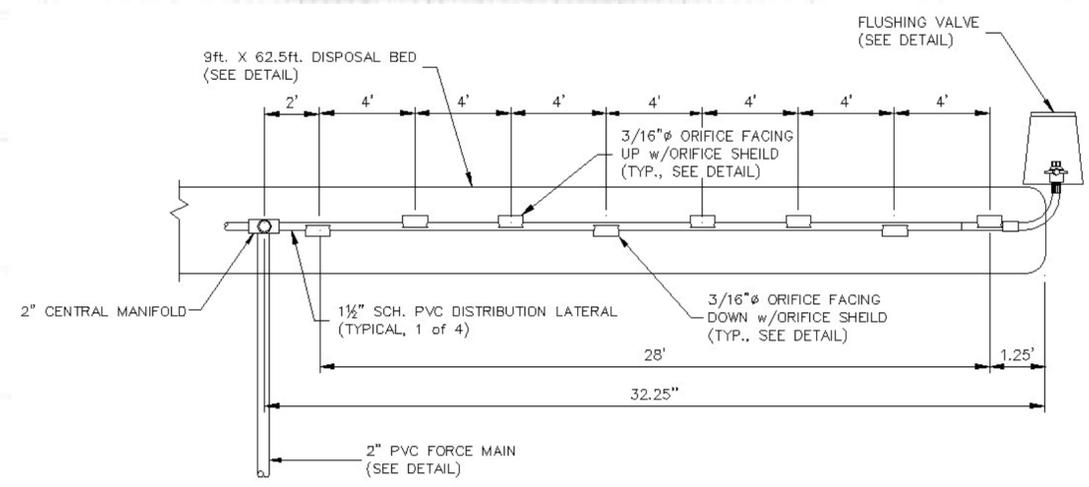
PUMP STATION DETAIL
NOT TO SCALE



SECTION A-A
NOT TO SCALE



DISPOSAL BED DETAIL
NOT TO SCALE



DISPOSAL FIELD LATERAL/ORIFICE SPACING DETAIL
NOT TO SCALE

SHEET REVISED by: *[Signature]*

STATE OF VERMONT
DAVID W. FUQUA
NO. 280-B
LICENSED DESIGNER

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DETAILS

TOM BOVE
LAKE ROAD
CHARLOTTE, VERMONT

STATE OF VERMONT
FRANK R. O'BRIEN
NO. 3686
REGISTERED PROFESSIONAL ENGINEER

DRAWN: MS	DATE: 03-17-87
SCALE: NOTED	PROJECT NO.: 6127
PREPARED BY: FRANK R. O'BRIEN, P.E. ROUTE 7, SHELBURNE, VERMONT	
SHEET 2	OF 2